Abstract

A product line is a family of products designed to take advantage of their common aspects (commonalities) and predicted variabilities. A product line may be software only, e.g., a family of GUIs; software + hardware, e.g., a family of televisions; or hardware only. Where software is a part of the product line, the variability accommodated by the product line is an economic decision and strongly affects the technology and the architecture used in the design and implementation of the product line. For example, where variability is narrowly bounded, a domain specific language may be used to define the product line and generate members of it, but the market for it may be relatively narrow. On the other hand, initial investment cost may be high, production cost very low, and time to market very short. Where variability is broadly bounded, a complex software architecture may be needed, production of products may be only semi-automated, time to market may increase, but market appeal may be much wider. Empirical studies, using baseline techniques, suggest that applying product line engineering produces a factor of three to five improvement in product development cost or product development speed.

This talk will focus on the architectural considerations in defining and designing a product line, particularly questions such as "What are the attributes of a good software product line architecture?" and "How might a product line architecture change the economics of software development?", introducing an open market both in architecture and in software components. I will illustrate points with examples taken from Lucent Technologies and Avaya, from the Software Product Line Hall of Fame, from building architecture, and from other industries.

Biography

David M. Weiss received the B.S. degree in Mathematics in 1964 from Union College, and the M.S. in Computer Science in 1981 from the University of Maryland. He is currently the Lanh and Oahn Nguyen professor of software engineering at Iowa State University.

Previously, he was the Director of the Software Technology Research Department at Avaya Laboratories, where he worked on the problem of how to improve the effectiveness of software development in general and of Avaya's software development processes in particular. To focus on the latter problem, he formed and led the Avaya Resource Center for Software Technology.

Before joining Avaya Labs, he was the head of the Software Production Research Department at Lucent Technologies Bell Laboratories, which conducted research on how to improve the effectiveness of software development. Prior to Bell Labs, he was Director of the Reuse and Measurement Department of the Software Productivity Consortium (SPC). Before SPC Dr. Weiss spent a year at the Office of Technology Assessment, where he was co-author of a technology assessment of the SDI. During the 1985-1986 academic year he was a visiting scholar at The Wang Institute, and for many years was a researcher at the Naval Research Laboratory in Washington, D.C. He has also worked as a programmer and as a mathematician. Dr. Weiss is a senior member of the IEEE.

Dr. Weiss's principal research interests focus on software development processes, software design, and software measurement. His best known work is the goal-question-metric approach to software measurement, his work on the modular structure of software systems, and his work in software product-line engineering as inventor of the FAST process. He is co-author and co-editor of two books: Software Product Line Engineering, and Software Fundamentals: Collected Papers of David L. Parnas. Papers on which he has been co-author have three times won retrospective awards, twice from the IEEE and once from the ACM.